

USE OF PORTFOLIOS BY MEDICAL STUDENTS: SIGNIFICANCE OF CRITICAL THINKING

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Portfolios have been used in the medical curriculum to evaluate difficult-to-assess areas such as students' attitudes, professionalism and teamwork. However, their use early in a problem-based learning (PBL) course to foster deep learning and enhance students' self-directed learning has not been adequately studied. The aims of this paper are to: (1) understand the uses of portfolios and the rationale for using reflection in the early years of a PBL curriculum; (2) discuss how to introduce portfolios and encourage students' critical thinking skills, not just reflection; and (3) provide students with tips that could enhance their skills in constructing good portfolios.

Key Words: critical thinking, medical education, portfolios, problem-based learning, reflective journals, self-directed learning, student's learning
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INTRODUCTION

Without reflection, we go blindly on our way, creating more unintended consequences, and failing to achieve anything useful.

—Margaret J. Wheatley [1]

Reflection is a key element of most portfolios, particularly those assigned for learning purposes. A portfolio is a collection of evidence maintained and presented for specific goals. Portfolios aim at encouraging active, self-directed learning, and reflective practices [2–4]. Therefore, portfolios may be used to: (1) provide evidence of a learner's competency and personal and professional growth; (2) provide learners with the opportunity to learn from challenging situations and evaluate their behavior and practices; and (3) assess the development of skills such as critical thinking and

self-evaluation [5]. However, the use of portfolios in the early years of a problem-based learning (PBL) curriculum has not been thoroughly investigated and there are no solid studies in the literature that have addressed its use to foster students' learning in a PBL curriculum.

The aims of this paper are to address the use of portfolios in the early years of a PBL curriculum and in particular to: (1) understand the uses of portfolios and the rationale for their use in the early years of a PBL curriculum; (2) discuss how to introduce portfolios and encourage students' critical thinking, not just reflection; and (3) provide students with tips that could enhance their skills in constructing good portfolios.

RATIONALE FOR USING PORTFOLIOS IN THE EARLY PBL YEARS

Many medical schools have adapted a PBL curriculum aimed at graduating more reflective, competent and self-directed practitioners. A PBL curriculum focuses on activation of prior knowledge as a key element to process new information where the learning activities start with a problem [6]. In this process, a number of



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cognitive and learning skills are enforced, such as identification of the problems in the trigger, generation of hypotheses, construction of an enquiry plan, interpretation of the new knowledge, use of knowledge obtained from history and clinical examination in making priorities between hypotheses, interpreting the laboratory and radiological investigations, and constructing a management plan for the patient. Such skills are necessary for a successful PBL discussion and may vary from one PBL group to another. However, students' transition from high school, where learning is focused on factual knowledge and learning is passive, to a PBL curriculum, where learning is focused on deep understanding and cognitive skills, might be challenging to a good number of students, particularly in the first 6–12 months of being in a PBL program. There is also evidence that different students have different styles of learning, and medical students use a wide range of learning styles during a medical course [7].

To ensure the success of PBL programs and that students are able to cope with the new curriculum structure, most medical schools train their tutors in workshops on key facilitation skills, allocate the writing and development of PBL cases to a team of academics with an expert in PBL, and continuously mentor the PBL tutorials. These schools also develop a mechanism for receiving feedback from students and mentoring interactions in small groups. Furthermore, early in the first year, students are usually trained in workshops about the design of PBL and their roles in PBL tutorials. Although these approaches have been used by most schools adopting PBL, these approaches might not be adequate for enhancing students' learning and developing their metacognitive skills in the way needed in PBL [8].

The use of portfolios might add a new dimension to the students' learning process, particularly when there is a need for learning new skills, and developing new attitudes and different approaches to learning [9]. However, there are very few studies in the literature that have adequately addressed the use of reflective journals and portfolios in the early years of a PBL curriculum [10].

What can portfolios add to these measures taken by most medical schools? In what way can portfolios be useful? In what way can portfolios enhance students' learning in a PBL curriculum?

Studies have shown that portfolios may encourage learners to reflect on their performance [11], help

in assessing learners' competence development [12], enhance students' personal and professional development [13], and foster self-directed learning and reflective practices [14,15]. Other uses of portfolios may include [5,9–16]:

- empowering students to reflect on and critically analyze what they have learnt;
- enabling students to identify what they need to learn;
- encouraging students to improve their self-directed learning skills;
- providing students with the opportunity to critically evaluate their work;
- enabling students to identify their overall goals and objectives;
- enabling students to specify skills that they need to develop;
- enabling students to reflect on their observations, reinforce their objectives, and monitor their progress;
- allowing students to think about future areas of their development as learners;
- enabling students to take their learning to a deeper level; and
- enabling their mentors to get to know more about them.

These outcomes, however, may vary between students depending on their prior skills in reflection, their commitment to this task, and their willingness to improve their learning style and their willingness to effectively use portfolios in achieving these outcomes.

STRATEGIES FOR INTRODUCING PORTFOLIOS

The introduction of portfolios and reflective journals requires training for both students and teachers. Students need to know how portfolios can improve their learning in a PBL course, what a portfolio is, how they can construct their portfolios, what is expected from them and what a portfolio looks like. Teachers need to be aware of these issues as well as how to assess a portfolio and how to provide constructive feedback to their students to improve their portfolios. Briefing tutors and students about portfolios may not be the ideal approach; a training workshop with hands-on learning of these skills and small group discussion of examples of portfolios may be much more productive

to both groups. The following Keys might be useful as you plan to introduce portfolios [2,14,16–20]:

- **Key 1:** Learning by using portfolios is more efficient when both teachers and students are clear about what is needed from them.
- **Key 2:** Learning by using portfolios is more efficient when adequate guidelines and examples of portfolios are provided to students.
- **Key 3:** Learning by using portfolios is more efficient when constructive feedback is provided by the teacher with suggestions for improvement.
- **Key 4:** Learning by using portfolios is more efficient when the learner believes in the value of a portfolio and demonstrates a number of skills such as reflection, analysis, evaluation, self-regulation, working on challenges, and making decisions.
- **Key 5:** Learning by using portfolios is more efficient when the portfolio contributes to the end of year summative assessment.
- **Key 6:** Learning by using portfolios is more efficient when they provide students with the opportunity to pursue personal learning goals.
- **Key 7:** Learning by using portfolios is more efficient when the portfolio has a clear structure.

CHALLENGES FACING THE USE OF PORTFOLIOS

Reflection provides students with the opportunity to look back on their behavior, analyze their actions, think up alternatives and plan to place new ideas into action. Therefore, reflection can be a useful tool for learning if used effectively by students [10]. However, several challenges may face the introduction of portfolios in the early years of a PBL course. The reason for these challenges is usually due to lack of knowledge about portfolios and their function among teachers and students, and the general feeling that portfolios are labor-intensive for both students and teachers. Providing information and training workshops is one of the key elements for minimizing the effects of these challenges. Also, by offering students illustrative examples of portfolios or a template to use, students might become more able to use portfolios effectively [21]. Other common challenges reported in the literature are: (1) reflection might be difficult for some students; (2) students often do not appreciate the portfolio's value [22]; (3) students may use it as a file

for information rather than providing evidence of experience or critically analyzing what they have learnt [23]; and (4) the validity of portfolio assessment may suffer from bias due to irrelevant qualities such as layout and writing style [24].

Snadden and Thomas believe that general practice trainees need to be exposed to salient experiences to be successful in reflection. If they are not exposed to challenging experiences, they can become "portfolio tired" [18]. It is possible that introducing portfolios to first year students may become challenging for them. However, guiding them on how to use their experiences in PBL and small group discussions might be helpful. The following open-ended questions might be useful in guiding students' reflection [5]:

- How is PBL different from what I used to do?
- What is my role in PBL tutorials?
- Do I understand what I need to do to achieve my goals?
- Am I a regular contributor to the discussion in my group? What is preventing me from contributing more?
- What roles did I take on this week?
- What roles did I avoid taking on? Why?
- How can I improve my skills in these areas?
- Do I need help in any area?
- How can my contribution to my PBL group become more useful to the group dynamic?
- How do I feel about these experiences?"

PORTFOLIOS AND CRITICAL THINKING

The primary aim of a portfolio is not to record daily activities. A portfolio provides students with the opportunity to think through arguments and use higher-order thinking skills, to justify their views, to solve complex problems, and to reflect on challenges they faced during their learning. Reflection is a skill required in professional courses such as medicine and other health professional studies. In fact, reflection enhances students' active participation in learning needs identified and has a positive impact on continuous quality improvement [25]. A successful portfolio should encourage students to develop their critical thinking skills by addressing these elements in their portfolios: analysis, evaluation, prediction/inference, interpretation, self-regulation, lateral thinking, identifying gaps/problems and making decisions (see the Box).

Box. Elements of critical thinking that may enhance students' portfolios and reflections (Modified from Reference 26)

- Analysis: The ability of students to break a difficult concept/idea into small components in order to understand its different components and inherent relationships.
- Synthesis: The ability of students to construct new knowledge from a number of resources and answer their research questions on a particular issue.
- Evaluation: The ability of students to assess and weigh the evidence and make reasonable judgments and find possible causes within a given context/problem.
- Interpretation: The ability of students to use knowledge available to them to explain findings/changes in a meaningful way and explain their significance and their impact.
- Prediction: The ability of students to make conclusions, know consequences on the basis of available knowledge and careful assessment of the situation.
- Making an Enquiry Plan: The ability of students to define their research questions for a problem, identify the resources they need, and construct knowledge learnt that may throw more light on their investigation.
- Self-regulation: The ability of students to be orderly and to be able to manage their time and resources in an effective and productive way.
- Lateral thinking: The ability of students to make connections and links between findings and use these links in making conclusions and justifying their views.
- Decision-making: The ability of students to choose between options and decide on certain actions on the basis of careful assessment of the situation, current knowledge and options available to them.

Why is critical analysis in the students' portfolios useful to their learning? In what way does it add to the value of portfolios? These critical thinking skills are essential for active learning; they add new dimensions to the learning process and allow deep learning, better understanding of difficult concepts, and the ability to deal with complex and difficult problems [26]. By highlighting these skills in the portfolios and practicing it, students will be able to improve their performance and focus their learning to become more meaningful and strategic.

CONSTRUCTING A SUCCESSFUL PORTFOLIO: TIPS TO STUDENTS

Students may need tips to guide them in constructing their portfolios. These tips may also be used as a checklist to help them review their portfolios and improve its content. I would encourage educators to make copies of these tips for their students as they prepare for training workshops targeting the introduction of portfolios in the early years of the curriculum [5].

Tip 1: Take action

Get started today. Make your portfolio a priority. There is no doubt that by starting early, you are most likely to get the most out of your portfolio. By starting now, you will feel better about yourself and you will have more time to think, reflect, plan and manage your portfolio effectively.

Tip 2: Understand what is needed from you

Read the guidelines you have received from your teacher/mentor. The aims of these guidelines are to: (1) provide you with key information about portfolios and how to construct your journals; (2) ensure that you have support from your mentor/teacher; and (3) provide you with information about feedback and how to use feedback from your teacher to improve your portfolio. It is very important that you understand what is required from you before you start working. This might include: the purpose of the portfolio, the style recommended, probing questions, critical analysis embedded in the portfolio, evaluation criteria, time available for you to construct your portfolio, and the role of your teacher/mentor.

Tip 3: Have a clear purpose

Every portfolio should have a purpose. The more you are clear about your purpose, the more focused you will be in your approach and be able to deeply explore what you want to do. Your purpose should define your goals and what you want to achieve.

Tip 4: Invest in reflection and critical thinking

Remember that the aim of your portfolio is not just to mention events and learning activities, it is more about quality reflection in which you explain difficult situations, analyze contributing factors, explore approaches for a solution, evaluate strategies, make inferences, think laterally and define your justification.

The more you invest in these processes, the more you will achieve from your portfolios.

Tip 5: Be creative

Creativity is an important element for success. Always think about creative ideas that enable you to become clear, objective, and able to explore your thoughts in an engaging way.

Tip 6: Provide examples

By providing examples in your reflective journals, you will be able to: (1) dig deeper in your reflections and what you have experienced; (2) reflect upon circumstances, challenges, contributing factors, the progress of events; and (3) enforce your ownership of the situation and the consequences of its events.

Tip 7: Keep organizing your portfolio

Organization of your portfolio is one of the keys for successful outcomes. Start with your purpose and goals. Use a template and be consistent in your approach.

Tip 8: Be committed

Without commitment, you cannot achieve success. Commitment means to “incise away” any obstacles that may hold you back from achieving your goals. Your commitment to this task is vital. Do not leave it as the last thing to do. A good idea is to start your learning by adding a few ideas/thoughts to your portfolio and consolidating your objectives for what you have achieved, learnt and need to do. Reflect on your commitment to this task and how you feel about your success.

Tip 9: Enjoy what you are doing

Think about mechanisms that allow you to enjoy your work and make you feel good as you construct your portfolio. Such feelings will empower and energize you. Do not work on your portfolio as a daily routine or something you have to do. These negative thoughts will limit your benefits from reflection. Always empower yourself with positive thoughts.

Tip 10: Receive feedback

Continuous feedback from your teacher/mentor will enable you to improve your portfolio. Use feedback for your growth and see the value behind it. Do not take negative issues personally. The feedback from

your mentor may help you to: focus your purpose, define your goals, revisit your approach, enhance your reflection and use of critical thinking skills, maximize your learning potential and improve the overall design of your portfolio.

Tip 11: Learn from your failures

Portfolios, if used in the right way, can help you to think and reflect on difficult experiences and failures. It can be an effective tool for empowering your thoughts to think about lessons you have learnt from such different situations, what you need to do if you face similar challenges again, and how to look for alternatives and better options.

Tip 12: Look for improvements

Always aim to improve and think about strategies that ensure you monitor your progress and look for competence and deep learning.

Tip 13: Keep asking questions

Open-ended questions are keys to the successful construction of your portfolio. Keep asking yourself in a reflective way about the different learning situations you have experienced. Use analysis, evaluation, inference and lateral thinking for empowering your thoughts and improving your reflection.

Tip 14: Keep your focus

By writing your learning experiences down, you will be able to explore situations, examine what has occurred, explore your personal beliefs about a situation, find solutions, examine your willingness to change, and plan for alternatives. Use such situations for personal growth and development. Always keep focused on what you have learnt.

Tip 15: Eliminate negative thoughts

Negative thoughts can stop you from doing your portfolio and limit your reflections. The key to successful reflection is to eliminate all negative thoughts and work with passion, with no fears.

Tip 16: Monitor your progress

Observe and reflect on areas you believe you have made improvements in, and areas that you need to work further on. Explore ideas and an action plan for such purposes. Continually assess the success of your plan.

CONCLUSION

Portfolios and reflective journals can be used in the early years of a PBL curriculum to enhance students' learning skills and improve their performance. The keys for successful implementation of portfolios are: training teachers and students on portfolio construction, having a clear purpose, providing examples or a template, giving opportunities for continuous feedback, and making portfolios part of the summative assessment. The primary aim of a portfolio is not recording daily learning activities but rather reflecting on challenges, difficult situations, and addressing a number of critical thinking skills such as analysis, evaluation, interpretation, inference, and lateral thinking.

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